

**Work Order ID 55406**

January 18, 2010 10:33:22 AM



Page 1

Item ID: D212-664-107

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Low Standard Fwd

Start Date: 1/18/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 1/28/2010 Req'd Qty: 1.00



Customer:

Reference:

Run Start

Approvals: Process Plan: MF Date: 10-1-18

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

Draw Nbr

Revision Nbr

D212-664-147

Rev B

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-107 CHG001

5 10/02/17HF for BG 10/02/17

110

0.00



Packaging

Packaging

Memo

0.00

Packaging

CV MB 10-01-21

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-107 using CNC bender program 212-107

CV MB 10-01-21

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

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Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

=> S1010121

(X)

140

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1-Cut tube as per inspection dwg. \*\*\*ensure saw is square\*\*\*

2-Drill pilot holes in tube as per Dwg D212-664-147

3-Drill Rivet holes as per Dwg D212-664-147 using DT8972.

4-Ream hole to finish size in tube as per Dwg D212-664-147

5-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-147



10-1-26

MB  
10-01-27

W/O:		WORK ORDER CHANGES					
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Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

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QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject- Number	Insp. Stamp
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150

Crosstubes Chemical Conversion

0.00



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

(1K)

0

no 10-00-28

160

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Quality Control

=> 8/10/1/28

170

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

R.H.C. call on + Both pass though

=> 8/10/1/28

(XC)

0

**Dart Aerospace Ltd**

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**NOTE:** Date & initial all entries

January 18, 2010 10:33:22 AM

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**Setup Start**[illegible]

**Stop**

**Cust Item ID:**

**Abstract**

**Customer:**

**Reference:**

Run Start



**Approvals:**      **Process Plan:** \_\_\_\_\_ **Date:** \_\_\_\_\_ **Tooling:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Stop**



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

**Insp.  
Stamp**

[illegible]

0.00

Liquid Penetrant Inspection as per QSI 038Or  
Issue P/O: 11290 LPI as per ASTM 1417  
Level 2 Attach copy of NDT results to work order

0.00

**RESEARCH DESIGN AND METHODS**

### Packaging

## Packaging

## Memo

0.00

## Packaging

Ensure copy of NDT results attached to work order.

0.00

QC

## Memo

0.00

## Quality Control

Inspect for damage & ensure results are as per Dwg D212-664-107

Pl 10-2-01

①

P. 14/2/0 = 1

 10 02 02 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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January 18, 2010 10:33:22 AM

Item ID: D212-664-107

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Item Name: Crosstube Low Standard Fwd

Start Date: 1/18/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 1/28/2010 Req'd Qty: 1.00



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Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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210

0.00



Crosstubes

Accept Qty: 10  
Reject Qty: 02  
Reject Number: 02  
Insp. Stamp: (1)

Crosstubes

Memo

0.00

Crosstubes

1-Rivet Cuffs as per Dwg D212-664-147. with Sika flex in Between tube & Cuff  
A/R SIKAFLEX -241/-291 BATCH: 112345

220

0.00



SprayPaint

Accept Qty: 10  
Reject Qty: 02  
Reject Number: 10  
Insp. Stamp: (1)

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: 8:00  
Fininsh Time: 8:30

PAINT:

Start Time: 2:30  
Finish Time: 3:30

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**Work Order ID 55406**

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January 18, 2010 10:33:22 AM

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Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

230



QC14- Inspect Spray Paint

0.00

QC

Memo

0.00

Quality Control

Wrap in plastic bag to protect from scratches

25 10-02-11 (X)

240



Crosstubes

0.00

Crosstubes

Memo

0.00

Crosstubes

1- Assemble as per Dwg D212-664-147

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3- Instal support with magnobond 6398 per dwg D212-664-147, cure for 12hrs before packaging.

Time &amp; date of application: 11:00

Batch: 112417

EXP. DATE 01/2011

Torque: ml 10/02/11 (i)

m 10 02 16 (i)

W/O:		WORK ORDER CHANGES					
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NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

250

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

260

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

270

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D212-664-107

MVA

Comp/2/10/11

W/O:		WORK ORDER CHANGES					
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Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

10/02/18 JG  
ME  
10-2-18

W/O:		WORK ORDER CHANGES					
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# Picklist Print

January 18, 2010 10:33:22 AM

Page 1

Work Order ID: 55406

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 1/18/2010

Required Date: 1/28/2010

Comments: IPP Rev:A New Issue 07.09.12 EC verified by: JLM  
 IPP Rev:B ECN 1100 08-01-11 DD verified by: EC  
 IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/	Replacement	Mfg/	Bin	Primary	Last	Route	Unit of	Qty on	Remaining	Qty	Date	Status
D212-664-107TRN		Manufactured	No			140	Each	5.0000	1.0000			
Crosstube Turning Detail												

Warehouse	Location	Loc Qty	Loc Code
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Main Warehouse

LG

5

50700

1

50705

1

50706

1

53419

1

53420

1

D3659-1

Manufactured

No

220

Each

16.0000

2.0000

CUFF

Warehouse	Location	Loc Qty	Loc Code
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Main Warehouse

ST

15

50691

15

Main Warehouse

ST477

1

52598

1

DP 10-1-26

ex 10-0717

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Start Qty: 1.00

Required Qty: 1.00

Component Item ID/	Replacement	Mfg/	Bin	Primary	Last	Route	Unit of	Qty on	Remaining	Qty	Date	Status
CR3212-4-06		Purchased	No			240	Each	1,706.000	44.0000			



CHERRY RIVET

Warehouse	Loc Qty	Loc Code
Location		

Main Warehouse

ST	1706	
107534	6	
111492	200	
112612	500	
112724	200	
112794	800	

m/ 10/02/02

D3595-063-450

Manufactured No



RUBBER CUSHION

Warehouse	Loc Qty	Loc Code
Location		

Main Warehouse

LG	55.15767369	
52447	55.1576737	
Main Warehouse		
ST	104.9689	

m/ 10/02/16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

January 18, 2010 10:33:22 AM

Work Order ID: 55406



Parent Item: D212-664-107



Parent Item Name: Crosstube Low Standard Fwd

Start Date: 1/18/2010

Required Date: 1/28/2010

Comments: IPP Rev:A New Issue 07.09.12 EC verified by: JLM  
 IPP Rev:B ECN 1100 08-01-11 DD verified by: EC  
 IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/	Replacement	Mfg/	Bin	Primary	Last	Route	Unit of	Qty on	Remaining	Qty	Date	Status
MS21920-25		Purchased	No			240	Each	173.0000	4.0000			



Clamp(per MIL-DTL-8783C)



Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST	173	
107456	2	
108111	3	
108975	17	
109181	42	
109644	10	
<u>111282</u>	4	
111429	1	
112495	1	
112919	18	
113281	25	
113282	50	

my 10/02/16

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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 IPP Rev:B ECN 1100 08-01-11 DD verified by: EC  
 IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/	Replacement	Mfg/	Bin	Primary	Last	Route	Unit of	Qty on	Remaining	Qty	Date	Status
D2893-1		Manufactured	No			240	Each	59.0000	2.0000			



2.75 Support

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST

59

25657

6

47109

2

47637

3

51775

19

53125

19

53340

10

m/ 10/02/16

D3428-1

Manufactured No

260

Each

5.0000

1.0000



Placard

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST096

5

50790

5

BSS565 10-2-17 SP

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



# Picklist Print

January 18, 2010 10:33:22 AM

Work Order ID: 55406



Parent Item: D212-664-107



Parent Item Name: Crosstube Low Standard Fwd

Start Date: 1/18/2010

Required Date: 1/28/2010

Comments: IPP Rev:A New Issue 07.09.12 EC verified by: JLM  
 IPP Rev:B ECN 1100 08-01-11 DD verified by: EC  
 IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/	Replacement	Mfg/	Bin	Primary	Last	Route	Unit of	Qty on	Remaining	Qty	Date	Status
AN6-35A		Purchased	No			260	Each	72.0000	4.0000			
											10-2-17	SP
BOLT												

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST 72

112314 22

112805 20

113422 30

AN6-36A	Purchased	No				260	Each	107.0000	4.0000			
											10-2-17	SP
Bolt												

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST 107

109632 1

110382 2

112314 54

113121 50

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

# Picklist Print

January 18, 2010 10:33:22 AM

Work Order ID: 55406



Parent Item: D212-664-107



Parent Item Name: Crosstube Low Standard Fwd

Start Date: 1/18/2010

Required Date: 1/28/2010

Comments: IPP Rev:A New Issue 07.09.12 EC verified by: JLM  
 IPP Rev:B ECN 1100 08-01-11 DD verified by: EC  
 IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/	Replacement	Mfg/	Bin	Primary	Last	Route	Unit of	Qty on	Remaining	Qty	Date	Status
MS21042L6		Purchased	No			260	Each	456.0000	6.0000			
											10-2-17 SP	
Nut												

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST	456	
105077	22	
110002	5	
111548	8	
111578	400	6
112492	21	

AN960JD616

Purchased

No

260

Each

597.0000

18.0000



Washer



10-2-17 SP

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST	597	
112314	3	
112828	294	18
113149	300	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

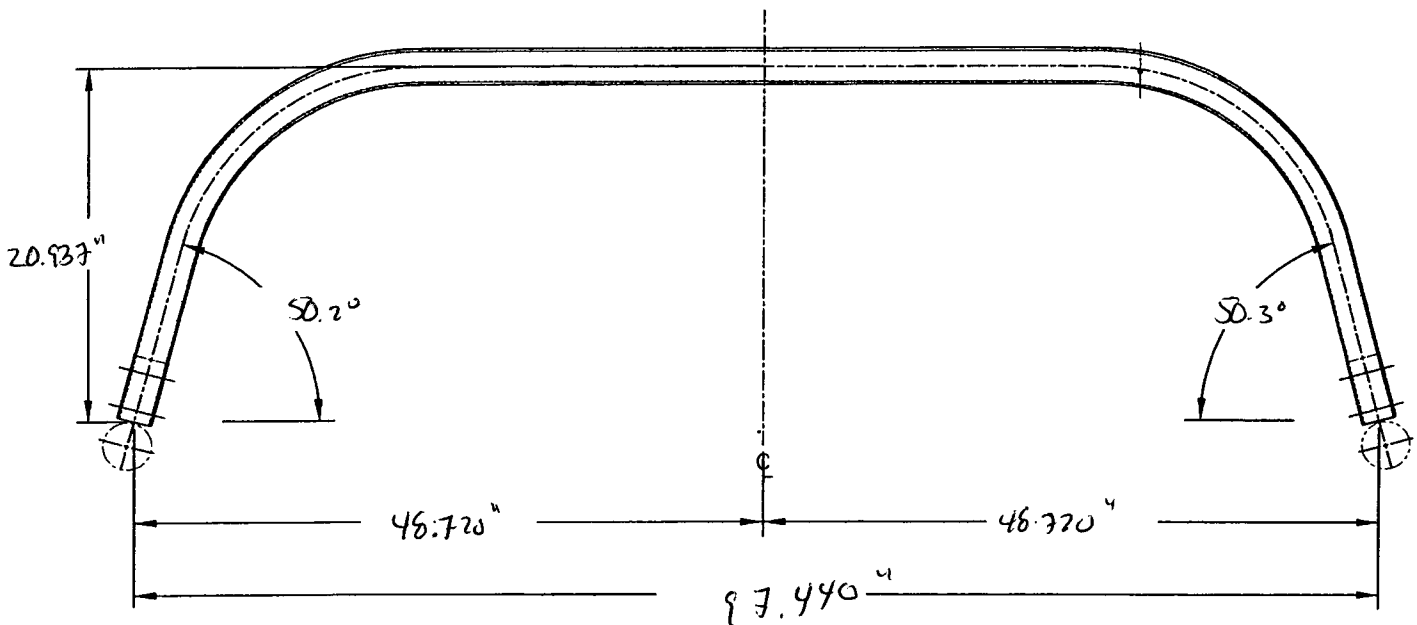
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	55406
Description: Crosstube Low Fwd (205/212/412)		Part Number:	D212-664-107
Inspection Dwg: D212-664-147	Rev: <i>BCA</i>	Page 1 of 1	

*10.01.21*

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments

QC15 Inspection	<i>S</i>
Date	<i>10/01/21</i>

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	

Item	Qty -147	Qty -147B	Part Number	Description
1	X		D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
2		X	D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)
3	1	1	D6019-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	2	2	D3659-1	CUFF
7	4	4	MS21920-25	CLAMP (OR MS21920-26)
8	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
10	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

# GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6019-128  
FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF  
USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-147 = 24.2 lbs (PER IIN-D212-664)  
D212-664-147B = 24.2 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD  
BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6%  
BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF  
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER  
INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1  
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE  
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS.  
DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE  
UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS  
NOT BOTTOMED-OUT AFTER TORQUING.
- 16) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF  
SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.  
SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 17) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

B	REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS; ADD -147B (ZN C4-2, D4-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. B
MFG. APPR.	RF	D212-664-147	SHEET 1 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

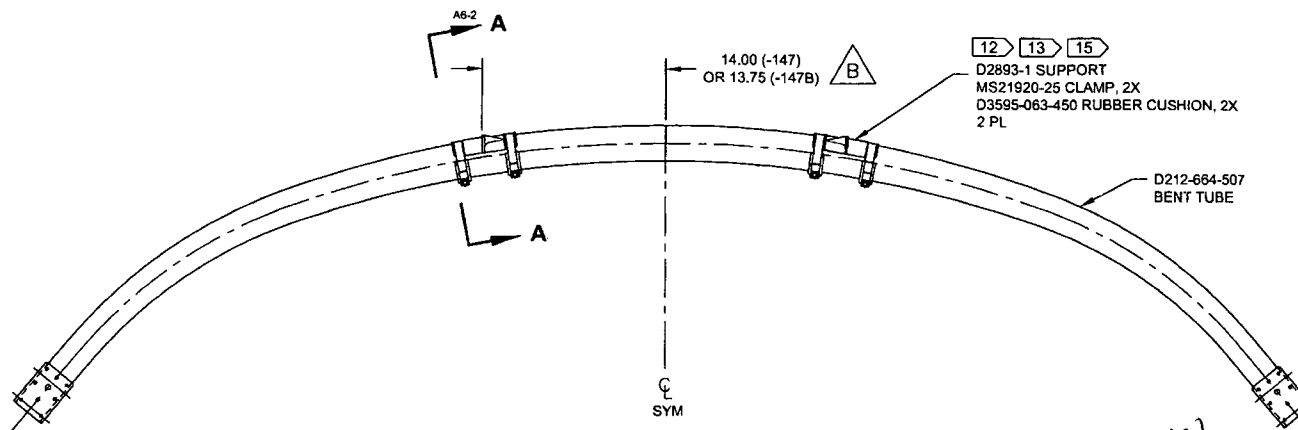
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

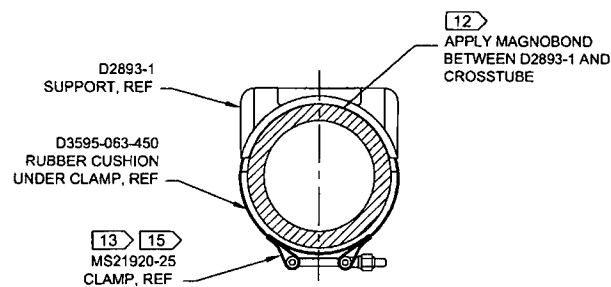
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



**D212-664-147/-147B  
ASSEMBLY DETAIL**



**SECTION A-A** DS-2  
SCALE 4X

**RELEASED**  
2009-10-29

DESIGN	97	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	97	DRAWING NO.	REV. B
MFG. APPR.	97	D212-664-147	SHEET 2 OF 4
APPROVED	97	TITLE	SCALE
DE APPR.	97	CROSSTUBE (205/212/412 LOW FWD)	NTS
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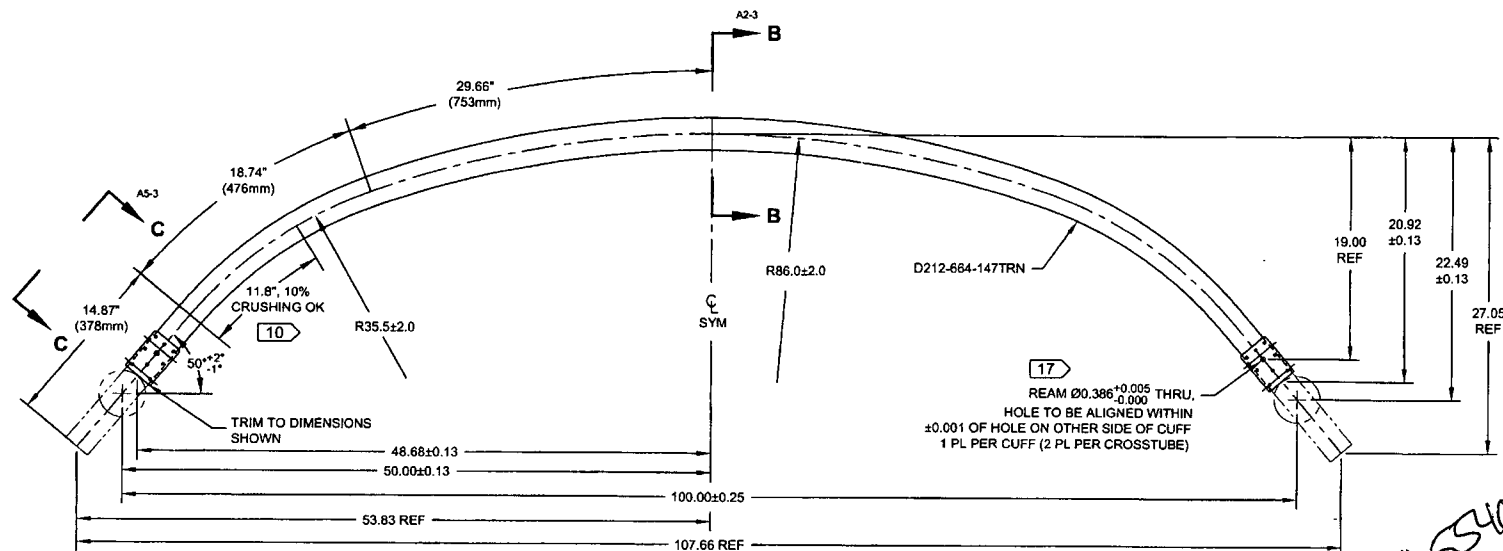
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

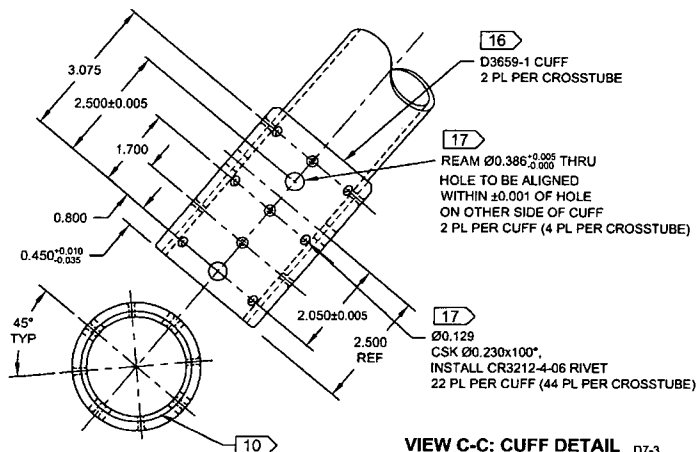
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

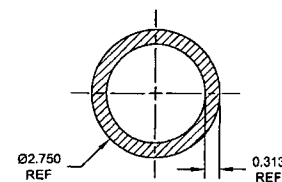
**NOTE:** Date & initial all entries



**D212-664-507**  
**BENDING AND DRILLING DETAIL** 10 B



**VIEW C-C: CUFF DETAIL** D7-3  
**SCALE 4X**



**SECTION B-B** D5-3  
**SCALE 4X**

**RELEASED**  
2009-10-23

DESIGN	90	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	90	DRAWING NO.	REV. B
MFG. APPR.	90	D212-664-147	SHEET 3 OF 4
APPROVED	90	TITLE	SCALE
DE APPR.	90	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD	
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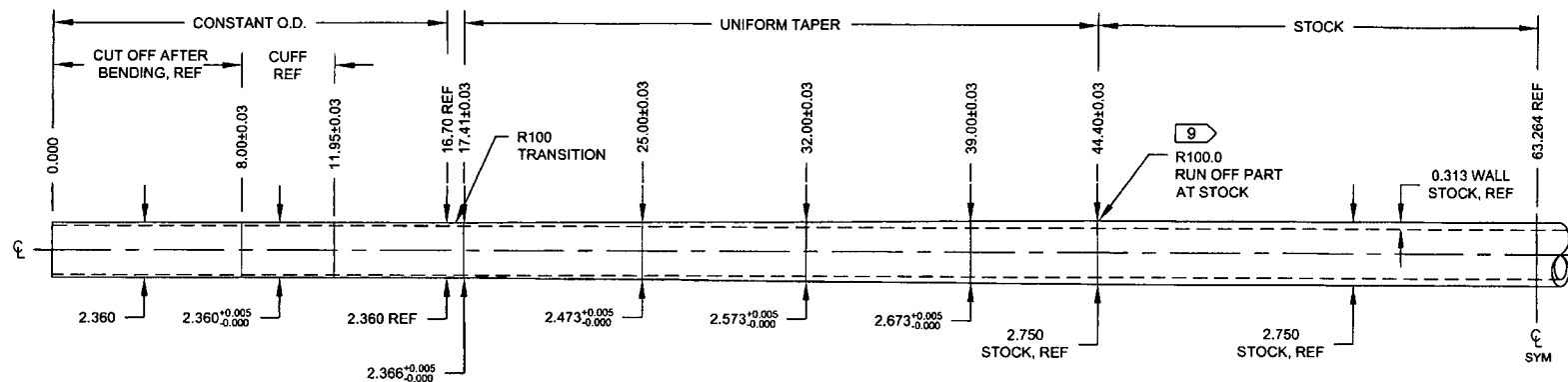
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



**D212-664-147TRN**  
**TURNING DETAIL**

**RELEASED**  
2009-10-29

DESIGN	9P	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9P	DRAWING NO.	REV. B
MFG. APPR.	9P	D212-664-147	SHEET 4 OF 4
APPROVED	9P	TITLE	SCALE
DE APPR.	9P	CROSSTUBE (205/212/412 LOW FWD)	NTS
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



# LIQUID PENETRANT TEST REPORT

P- 15316

CLIENT DAV Aerospace DATE FEB 1-2010 PAGE 1 OF 1  
ATTENTION LINDA ACUREN JOB No. 188-10-0650 TIME AM ☒ PM ☐  
ADDRESS 1270 ADELDEEN ST. POWO No. 11290  
HAWKESBURY ON. WORK LOCATION HAWKESBURY  
R6H 1K7 ACCEPTANCE STD. ASTM 1417 REV./DATE 2007  
PROJECT F.P.I. ON CROSS TUBES  
ITEM(S) EXAMINED (12) SLEEVE'S (6)

JOB DESCRIPTION STAINLESS STEEL PROCEDURE No. LT-002 REV./DATE LT-TAH 2 REV./DATE 2007  
PART NO. WET FLUORESCENT LIQUID PENETRANT INSPECTION MATERIAL ALUMINE ALUMINUM THICKNESS CARRIED OUT 100% EXTERNAL  
SCOPE CARRIED OUT 100% EXTERNAL

TEST DETAILS  
METHOD ☒ FLUORESCENT ☐ VISIBLE  
FAMILY BRAND MAGNAFLUX ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED  
PENETRANT 2L 6F MINIMUM DWELL TIME 45 MIN. BLACK LIGHT S/N 16859 ☒ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☐ AMBIENT < 2 fc  
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE  
DEVELOPER SKD 152 MINIMUM DWELL TIME 10 MIN. OTHER LABNO  
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY LIGHT METER S/N 1098866 CAL DUE DATE MAY 7-2010  
TEST SURFACE  
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☐ CLEAN BARE METAL  
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/ 50°F ☐ 10°C/ 50°F TO 52°C/ 125°F ☐ > 52°C/ 125°F  
RESULTS- ☐ METRIC ☐ IMPERIAL

12 SLEEVE'S - W.O. 55638 ✓  
1 CROSS TUBE - W.O. 55132 ✓  
1 CROSS TUBE - W.O. 55133 ✓  
1 CROSS TUBE - W.O. 55406 ✓  
1 CROSS TUBE - W.O. 55404 ✓  
20 COLLECTIVE BELL CRANK - W.O. 53635 ✓  
1 Mount - W.O. 55097 ✓  
1 CROSS TUBE - W.O. 55433 ✓  
1 CROSS TUBE - W.O. 55434 ✓

ALL ITEMS EXAMINED ON THIS  
REPORT WERE FOUND ACCEPTABLE  
TO THIS STANDARD.

M 10 02 02

Scope of Services  
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.  
Standard of Care  
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES  
CLIENT REPRESENTATIVE Matthew Marshall PRINT Matthew Marshall SIGNATURE  
TECHNICIAN (SIGNATURE): Mike Johnston SIGNATURE  
NAME (PRINT): Mike Johnston  
CGSB LEVEL II SNT LEVEL II CGSB LEVEL II SNT LEVEL II  
CGSB REG. NO. 6606 CGSB REG. NO. 6606  
DTR # E-27697  
REPORT REVIEWED BY: NAME INITIALS

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GOLD - OFFICE COPY